

## CLAIMS

What is claimed is:

1. A data link system comprising:

a shelter housing sensitive radio frequency equipment;

an antenna assembly located apart from the shelter; and

a single fiber, bi-directional fiber optic link coupling the antenna to the shelter, wherein both RF signals and data signals can be sent across the data link.

2. The system of claim 1 wherein the radio frequency equipment is located off the antenna.

3. The system of claim 1 wherein the system is adapted to use wavelength division multiplexing for the transfer of the RF signals and data signals.

4. The system of claim 1 wherein the system is adapted to send command link RF, return link RF, command and status signals over the fiber optic link.

5. The system of claim 1 further comprising fiber optic rotary joints adapted to pass the fiber optic link through antenna gimbals and a wavelength division multiplexing system to the antenna.

6. The system of claim 1 further comprising a wavelength division multiplexing system located in the shelter and coupling signals passing across the fiber optic link to and from other RF sensitive equipment in the antenna.

7. The system of claim 1 wherein the RF sensitive equipment in the shelter includes special transmitters and receivers for different wavelengths of signals passing across the data link.

8. The system of claim 1 wherein the shelter has an environment that is mild and dry.

9. The system of claim 1 wherein the antenna assembly comprises a radio frequency equipment assembly housing radio frequency equipment for the antenna and located on from the antenna.

10. The system of claim 1 wherein the antenna assembly includes wavelength division multiplexing system.

11. The system of claim 1 wherein the fiber optic link carries all radio frequency carriers for command link and return link and command and status signals between the antenna assembly and the shelter.

12. The system of claim 1 further comprising an enclosure for an antenna motor control and power supplies, the enclosure including configurable optical add drop multiplexers adapted to couple equipment in the enclosure to the antenna and shelter.

13. A data link system adapted to carry command link and return link command and status comprising:

a shelter unit housing sensitive radio frequency equipment;

an antenna radio frequency assembly located away from the shelter;

a single fiber, fiber optic link connecting the shelter and the antenna radio frequency assembly; and

an enclosure coupled to the fiber optic link, and between the shelter and the antenna assembly, the enclosure including antenna motor controls and configurable add/drop multiplexers.

14. The system of claim 13 further comprising fiber optic rotary joints in the antenna assembly adapted to pass the fiber optic link through antenna gimbals and a wavelength division multiplexing system to the antenna radio frequency assembly, wherein command link radio frequency signals, return link radio frequency signals and status signals are passed over the single fiber.

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15. The system of claim 13 wherein the shelter further includes location operator controls, intermediate frequency equipment and power supplies and is located a distance from the antenna radio frequency assembly.

16. The system of claim 13 wherein the antenna and the shelter are separated by approximately 10 kilometers of single mode fiber.

17. A data link system comprising:

a shelter unit housing sensitive radio frequency equipment;

an antenna assembly;

a radio frequency electronic assembly for housing radio frequency equipment related to the antenna;

a single fiber, fiber optic link between the shelter and the antenna assembly, wherein the fiber optic link is limited to two channels, a first channel and a second channel, and wherein the system is adapted to send two signals over each of the first and second channel; and

fiber optic rotary joints adapted to pass the fiber optic link through antenna gimbals to the Radio Frequency Electronics, wherein command link radio frequency signals, return link radio frequency signals and command/status signals are passed over the single fiber.

18. The system of claim 17 wherein the first channel is adapted to operate at a wavelength of 1310 nanometers and the second channel is adapted to operate at a wavelength of 1550 nanometers.

19. The system of claim 17 wherein the shelter further includes a transmitter operating at 1550 nanometers, a receiver operating at 1310 nanometers and a combiner splitter for 1310/1550 nanometers, and wherein the antenna includes a receiver operating at 1550 nanometers, a transmitter operating at 1310 nanometers and a combiner splitter for 1310/1550 nanometers.

20. The system of claim 17 wherein the system is adapted to carry both radio frequency signals and data signals across the data link.